



GA-140-LL

Normal Tg140 Dicy Curing Laminate and Prepreg

GA-140-LL is an advanced normal Tg (140°C/DSC) multifunctional epoxy laminate. Tetra-functional epoxy is designed for a higher Tg and better dimensional stability and through-hole reliability. General UV Solder mask may be applied simultaneously to both sides increasing productivity.

Laminate:GA-140-LL

Prepreg: GA-140B-LL

Key Features

- **Tg: 140°C(DSC)**
This material with multi-function resin, Tg values can reach above 140 °C(DSC).
- **Z-CTE(50-260):3.8%**
Under the PCB process of temperature requirement is not high, ensure the reliability of high temperature welding and assembly process.
- **T260: 20min**
Under the condition of soldering temperature requirements is not high, subjected to thermal shock for many times, still can maintain good material performance.
- **Td: 305°C**
Under the condition of soldering temperature requirements is not high, excellent resistance to aging temperature, keep the material performance in high thermal shock or high temperature environment impact.

Applications

- Multilayer PCB
- LCD Panels
- Telecommunications
- Memory Module

Industrial Approvals

- IPC-4101D/21
- UL File Number : e186152
- UL Type Designation : FR-4.0
- Flammability Rating : 94V-0
- Maximum Operating Temperature : 130 °C

Normal Size & Thickness

Thickness Inch (mm)	Copper Cladding OZ (µm)	Size Inch mm	Thickness Tolerance
0.002 (0.05)	1/3(12)	49×37 1244×0940	IPC-4101 Class C/M
To	To	49×41 1244×1042	
0.125 (3.2)	6.0(204)	49×43 1244×1093	

Characteristic GA-140-LL		Unit	Test Method	Typical Values	SPEC.
			IPC-TM-650 (or as noted)		
Volume Resistivity		MΩ-cm	2.5.17.1	5X10 ⁸	≥10 ⁶
Surface Resistivity		MΩ	2.5.17.1	2X10 ⁵	≥10 ⁴
Permittivity (RC 50%)	At 1MHz	-	2.5.5.9	4.83	≤5.40
	At 1GHz		2.5.5.9/2.5.5.13	4.33/4.49	/
	At 5GHz		2.5.5.13	4.39	/
	At 10GHz		2.5.5.13	4.34	/
	At 15GHz		2.5.5.13	4.31	/
Loss Tangent (RC 50%)	At 1MHz	-	2.5.5.9	0.0125	≤0.035
	At 1GHz		2.5.5.9/2.5.5.13	0.0162/0.0165	/
	At 5GHz		2.5.5.13	0.0185	/
	At 10GHz		2.5.5.13	0.0195	/
	At 15GHz		2.5.5.13	0.0205	/
Arc Resistance		Sec	2.5.1	126	≥60
Dielectric Breakdown		KV	2.5.6	40	≥40
Dielectric Strength(thickness<0.5mm)		KV/mm	2.5.6.2	40	≥30
CTI		PLC(V)	ASTM D3638	3(175-249)	/
Thermal Stress Test		-	2.4.13.1	Pass	Pass
Td (5% Weight loss)		°C	2.4.24.6	305	/
Glass Transition Temperature	DMA	°C	2.4.24.2	150	/
	DSC	°C	2.4.25	140	≥135
	TMA	°C	2.4.24	135	/
Thermal Conductivity		W/mK	ASTM D5470	0.35	/
Most Operation Temperature(MOT)		°C	UL Cert	130	/
T260		Min	2.4.24.1	20	/
X/Y-Axis CTE	Before Tg	PPM/°C	2.4.24	15/14	/
Z-Axis CTE	Before Tg	PPM/°C	2.4.24	50	/
	After Tg	PPM/°C		260	/
Z-Axis CTE (50~260°C)		%	2.4.24	3.80	/
Peel Strength (HTE 1OZ)		Lb/in(N/mm)	2.4.8	11(1.93)	≥6(1.05)
Flexural Strength	LW	N/mm ²	2.4.4	600	≥415
	CW	N/mm ²		500	≥345
E-modulus	LW/CW	Gpa	---	23/24	/
Flexural Modulus	LW/CW	Gpa	---	22/24	/
Moisture Absorption		%	2.6.2.1	0.095	≤0.8
Flammability		-	UL94	V-0	V-0

Note: 1. Test sample is 62mil 1/1 (without special remark).

2. The data above is only for reference, and the actual data will have deviation, according to varieties of test equipment and method.